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(54) Double ring gas burner.

(57) A double ring gas burner, particularly for built-in cooking hobs, comprising an injector support cup (2) on which a burner body (36) is removably applied, with an axial duct (38) inserted in said cup (2) in a position facing a gas delivery nozzle (12) fitted to the cup base, and a flame divider element (56) positioned in an annular seat (54) provided in the rim (40) of said body (36), characterised by further comprising :

— a disc-shaped element (50) rigid with the burner body for upperly closing the cup (2), the side wall of which comprises apertures (24) for intake of primary air, said apertures being placed below the cooking hob when said burner body is applied to it,

— a plurality of radial channels (52) connecting the axial duct (38) of the burner body (36) to the annular seat (54) for the flame divider element (56),

— a plurality of passages connecting the space overlying said disc-shaped closure element (50) and bounded externally by the rim (40) of the burner body to the space overlying the cooking hob (6) external to said rim.

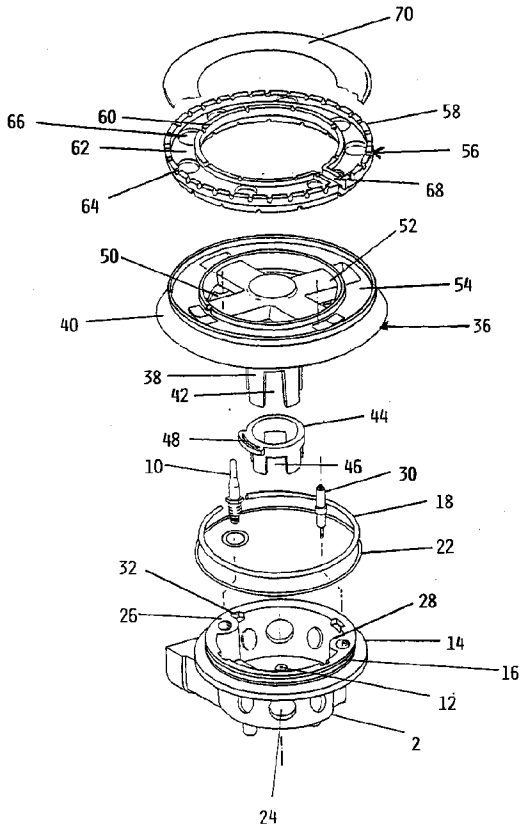

FIG. 1

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This invention relates to a double ring gas burner particularly for built-in cooking hobs.

Double ring gas burners are known comprising a cup of overall cylindrical shape, a burner body positioned on said cup and partly housed therein, and an annular flame divider provided in its outer edge and inner edge with two series of apertures through which a combustible gas-air mixture is delivered. The gas is fed by a nozzle positioned on the base of the cup, the air (primary air) being drawn in through ports situated above the cooking hob and kept separated from the secondary air by a horizontal baffle which prevents the dirt inevitably formed in the hob from entering the cup.

In addition, both the passages for the primary air and the passages for the secondary air which feeds the inner ring of the burner require for this purpose to project a certain extent above the hob, with possible problems of a technical nature in the positioning of the pan support grid and the application of a closure cover to said hob, in addition to possible detriment to apperance.

Finally, drawing in primary air from above the hob can be difficult if other burners present therein are simultaneously in operation.

The aforesaid drawbacks are practically absent in traditional pipe burners, which however suffer from drawbacks of another kind and in particular do not allow the gas delivery nozzle to be extracted from above without opening up the cooking hob.

An object of the invention is to provide a double ring gas burner, particularly for built-in cooking hobs, which has the advantages of known double ring burners of pipe and cup type, while at the same time eliminating their respective drawbacks.

A more particular object of the invention is to provide a double ring gas burner which allows easy extraction of the gas delivery nozzle from above without having to open up the hob.

A further object of the invention is to provide a double ring gas burner which is practically insensitive to the presence of other burners in operation on the same hob.

A further object of the invention is to provide a double ring gas burner in which the entry of dirt into the burner cup is practically eliminated.

A further object of the invention is to provide a double ring gas burner comprising an ignition spark plug and safety thermocouple, both withdrawable from above.

A further object of the invention is to provide a double ring gas burner in which the thermocouple and spark plug do not represent an obstacle to the usual cleaning of the cooking hob.

A further object of the invention is to provide a double ring gas burner with a flame divider element which combines the merits of high flame stability with the merits of low production cost.

All these aims are attained according to the invention through a double ring gas burner as described in claim 1.

A preferred embodiment of the present invention is described in greater detail hereinafter with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view of a double ring gas burner according to the invention;

Figure 2 is a plan view thereof;

Figure 3 is a side view thereof in the direction III-III of Figure 2;

Figure 4 is an axial section therethrough on the line IV-IV of Figure 2; and

Figure 5 is an axial section therethrough on the line V-V of Figure 2.

As can be seen from the figures, the double ring gas burner according to the invention comprises an injector support cup 2 applied to the metal plate 4 which lowerly bounds a traditional cooking hob, indicated overall by 6.

The cup 2 is provided on its base with a gas delivery nozzle 12 and is also provided at its open upper edge with a flange 14 and a overlying circumferential groove 16 for housing a steel ring 18 the purpose of which is to removably secure the cup to the upper metal plate 20 of the cooking hob 6.

A toroidal gasket 22 interposed between the flange 14 and plate 20 seals the connection between said plate and the cup 2.

The side wall of the cup 2 comprises a plurality of apertures 24 through which the primary air stream is drawn in from the outside of the cup, and also comprises two parallel enlarged portions 26, 28 situated in substantially diametrical position and provided for receiving a thermocouple 10 and a burner ignition spark plug 30.

In the case of a cooking hob delimited by an upper metal plate and a lower one, the apertures 24 are below the upper metal plate.

In the inner lateral edge of the cup 2 there are provided a plurality of notches 32 complementary to appendices 34 projecting from the lower surface of the burner body 36, which is positionable on said cup 2 and is secured in its angular position by the engagement between said appendices and said notches.

The burner body 36 is of traditional mushroom shape, with an axial duct 38 and an overlying rim 40. The axial duct 38 is of essentially cylindrical shape and lowerly comprises a plurality of lateral apertures 42 for entry of the primary air which is to mix with the gas leaving the nozzle 12. To allow regulation of this air flow, the axial duct 38 can be fitted with a sleeve 44 provided with lateral apertures 46 which, according to the angular position of the sleeve, face its apertures 42 to a greater or lesser extent, to hence regulate the primary air flow.

The angular position of the sleeve 44 relative to the axial duct 38 can be stabilized for example by a

screw passing through a slot 48 provided in the sleeve 44 and engaging in the burner body 36.

The burner body 36 also comprises a disc-shaped portion 50 of which the circumferential edge, step-shaped, rests on the edge of the cup 2 and is provided with appendices 34. This disc-shaped portion 50 completely closes the cup 2 to prevent dirt entering it.

In a position overlying said disc-shaped portion 50, the rim 40 of the burner body 36 comprises radial channels 52 connecting the axial duct 38 to an annular chamber 54 which, as will be more apparent hereinafter, houses a flame divider element 56. The radial channels 52, of which four are provided in the illustrated example, have a certain downward inclination starting from the centre of the burner and hence of the cooking hob.

In diametrically opposite positions in the inner edge of the disc-shaped element 50 of the burner body 36 there are provided two circular apertures, which are aligned coaxially with the seats provided in the two enlarged portions 26, 28 of the side wall of the cup 2, to allow passage of the thermocouple 10 and spark plug 30, which are hence contained within the overall outline of the burner and can be easily inserted from above during burner assembly and replaced when necessary.

Specifically, the thermocouple seat is internally threaded and provided on its base with a connector to provide electrical contact with the lower terminal of the thermocouple 10 when screwed into its seat.

The flame divider element 56 consists essentially of two cylindrical coaxial bands 58, 60 joined together by an annular web 62, to give the flame divider element an overall "H" configuration in cross-section. Both the coaxial bands 58, 60 are provided in both edges with a plurality of equidistant recesses 64, forming the two inner and outer main rings and inner and outer pilot rings.

The recesses forming the main ring and facing the thermocouple are inclined downwards to be able to use a thermocouple of standard type and hence maintain a small overall height of the assembly.

In the annular web 62 connecting together the two cylindrical bands 58, 60 there are provided a plurality of apertures 66 which because of the particular position (obligatory) of the flame divider element 56 relative to the burner body 36 do not face the outlets by which the radial channels 52 open into the annular chamber 54.

In the flame divider element 56 there is provided a short radial duct 68 the purpose of which, as described hereinafter, is to propagate the flame from the inner ring to the outer ring of the burner.

Finally, a traditional annular cover 70 can be applied to the flame divider element.

The double ring burner according to the invention consists substantially of two assembled parts. The first comprises the cup 2 fixed in the described manner to the cooking hob 6, and the second comprises the burner body 36 with its regulator sleeve 44, the flame divider element 56 housed in the annular cavity 54 of the body 36 and the cover 70 applied to the flame divider element.

This second burner part is removably supported on the egde of the cup 2 in an obligatory angular position, and can be easily removed when necessary.

The double ring gas burner of the invention operates as follows:

primary air is fed to the burner by passing from the interspace between the two metal plates 4 and 20 of the cooking hob 6 housing it, and through the apertures 24 provided in the side wall of the cup 2 until it grazes the nozzle 12 provided on the base of this latter, to be then entrained by the gas to form the combustible mixture. This passes through the axial duct 38 of the burner body 36 and the four radial channels 52 to reach the annular chamber 54 in the burner body, where because of the presence of the apertures 66 provided in the annular band 62 of the flame divider element 56 it pervades the space of said annular chamber 54 above and below said band 62, to emerge through the main and pilot cavities 64 of the outer ring 58 and inner ring 60.

When the spark plug 30 is activated, the spark ignites the mixture emerging from the pilot recesses 64 of the inner ring 60 which lie in front of said spark plug 30.

The flame which forms propagates progressively to all the other pilot and main recesses of the inner ring and also, by virtue of the radial duct 68 provided in the flame divider element 56, to the main and pilot recesses of the outer ring. The flames striking the thermocouple 10 activate it to cause the safety cock to remain open.

The secondary air for the combustion of the gas-primary air mixture in the inner ring passes below the rim 40 and between this and the upper plate 20 of the cooking hob to upperly graze the disc-shaped element 50.

From the aforegoing it is apparent that the double ring gas burner of the invention is advantageous compared with traditional burners, and in particular:

- it is provided with a cup and can therefore be applied to built-in cooking hobs of only a few centimetres thickness, and in addition allows easy extraction of the nozzle from above without having to open up the hob,
- the total upper closure of the cup prevents dirt from entering it during use, so that the burner maintains a constant optimum operating state,
- because of the outwardly downward inclination of the radial channels for the air-gas mixture, the overall height of the burner and hence of the entire cooking hob is very small,
- the ability to insert the spark plug and thermo-

couple into the burner from above facilitates assembly and any required replacement of either component,

- as both these components are housed in suitable seats provided within the overall burner outline, the components are protected and in addition the cooking hob can be easily and completely cleaned,
- the particular shape of the flame divider element considerably simplifies the operations required for its construction, the flame divider element complete with outer and inner main and pilot recesses being formable by a single pressing stage,
- by providing the apertures in the annular band of the flame divider element in a position different from the outlets of the radial channels for the gas-air mixture, there is no disturbance to the flames emerging from the various recesses,
- the presence of the radial duct in the flame divider element makes ignition of the outer ring of flames by the inner ring immediate.

Claims

1. A double ring gas burner, particularly for built-in cooking hobs, comprising an injector support cup (2) on which a burner body (36) is removably applied, with an axial duct (38) inserted in said cup (2) in a position facing a gas delivery nozzle (12) fitted to the cup base, and a flame divider element (56) positioned in an annular seat (54) provided in the rim (40) of said body (36), characterised by further comprising:
   - a disc-shaped element (50) rigid with the burner body for upperly closing the cup (2), the side wall of which comprises apertures (24) for intake of primary air, said apertures being placed below the cooking hob when said burner body is applied to it,
   - a plurality of radial channels (52) connecting the axial duct (38) of the burner body (36) to the annular seat (54) for the flame divider element (56),
   - a plurality of passages connecting the space overlying said disc-shaped closure element (50) and bounded externally by the rim (40) of the burner body to the space overlying the cooking hob (6) external to said rim.

2. A burner as claimed in claim 1, characterised in that the edge of the disc-shaped element (50) comprises a step complementary to the upper edge of the cup (2), to stabilize their mutual positioning.

3. A burner as claimed in claim 1, characterised in that the lower surface of the body (36) and the upper edge of the cup (2) comprise notches (32) and appendices (34) which mutually engage to secure their mutual angular positioning.

4. A burner as claimed in claim 1, characterised in that the side wall of the cup (2) is provided with an enlarged portion (26) in which a seat is formed for the insertion from above of a flame control thermocouple (10).

5. A burner as claimed in claim 4, characterised in that the position of the seat for the thermocouple (10) is such that said thermocouple is situated in proximity to the inner ring of the burner.

6. A burner as claimed in claim 4, characterised in that the disc-shaped element (50) is provided with an aperture for passage of the thermocouple (10) when inserted in its seat in the thickened portion (26).

7. A burner as claimed in claim 4, characterised in that the side wall of the cup (2) is provided with an enlarged portion (28) in which a seat is formed for the insertion from above of a spark plug (30) for igniting the burner.

8. A burner as claimed in claim 7, characterised in that the position of the seat for the spark plug (30) is such that said seat is situated in proximity to the inner ring of the burner.

9. A burner as claimed in claim 7, characterised in that the disc-shaped element (50) is provided with an aperture for passage of the spark plug (30) when inserted in its seat in the enlarged portion (28).

10. A burner as claimed in claim 1, characterised in that the flame divider element (56) consists of two coaxial cylindrical bands (58, 60) joined together by an annular web (62), both said cylindrical bands comprising in their edges a plurality of equidistant recesses (64) for passage of the gas-primary air combustible mixture.

11. A burner as claimed in claim 10, characterised in that the annular web (62) of the flame divider element (56) comprises a plurality of holes (66) arranged in a position not facing the outlets by which the radial channels (52) open into the annular seat (54).

12. A burner as claimed in claim 10, characterised in that at least those recesses (64) provided in the flame divider element (56) and facing the thermo-

couple (10) are inclined downwards.

13. A burner as claimed in claim 5, characterised in that a radial duct (68) for triggering ignition of the outer ring is provided in the flame divider element (56).

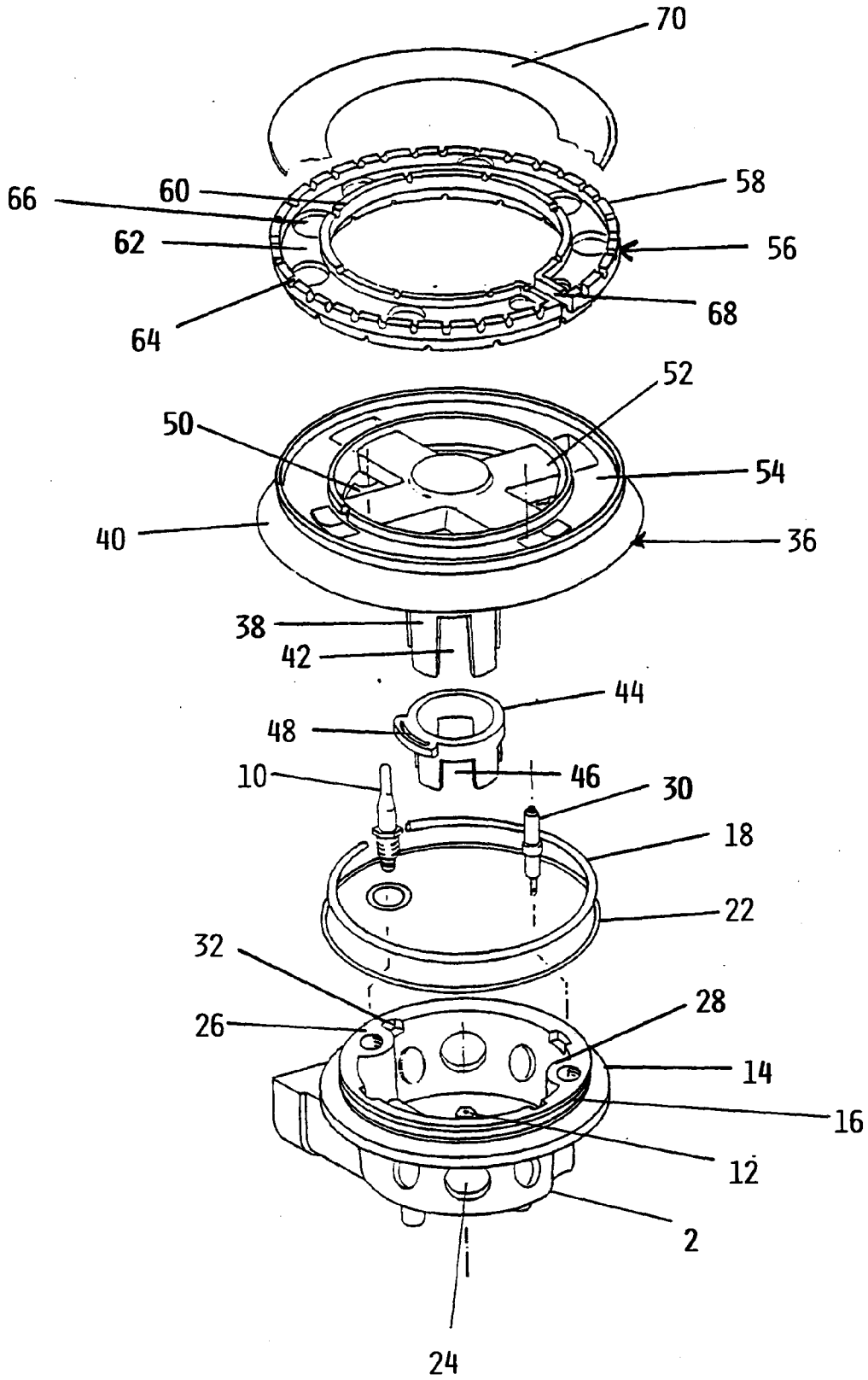


FIG. 1

FIG. 2

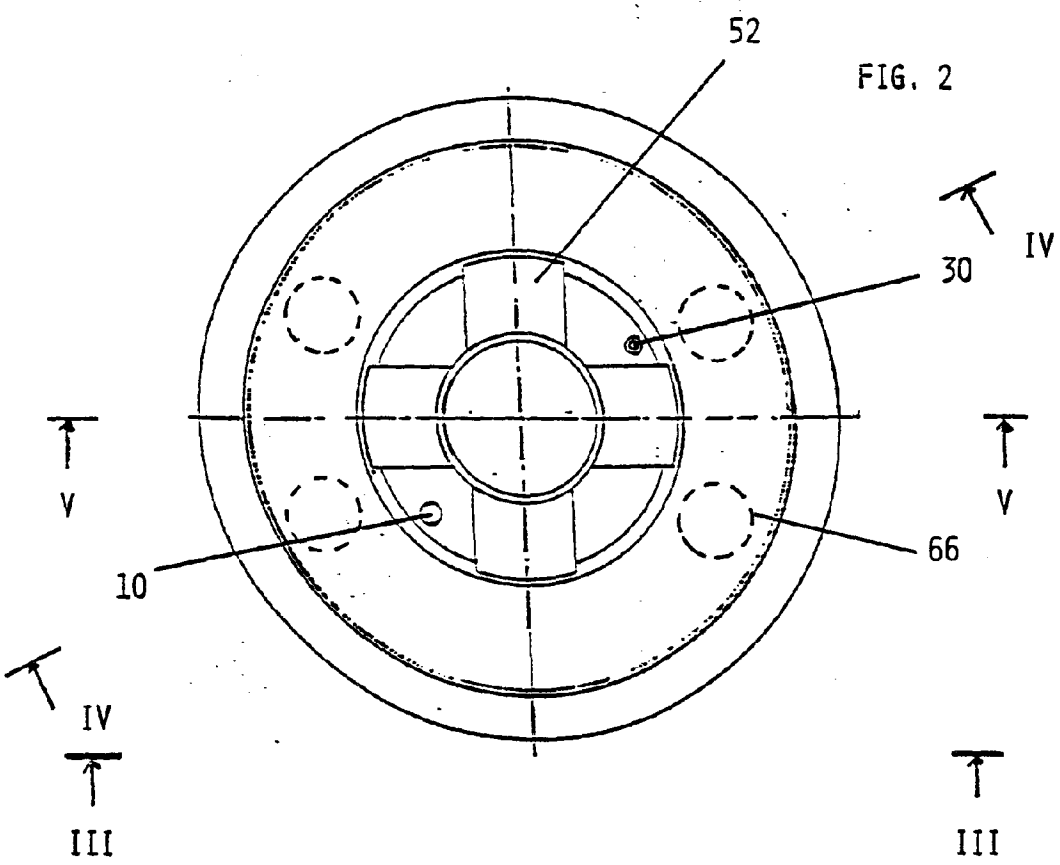
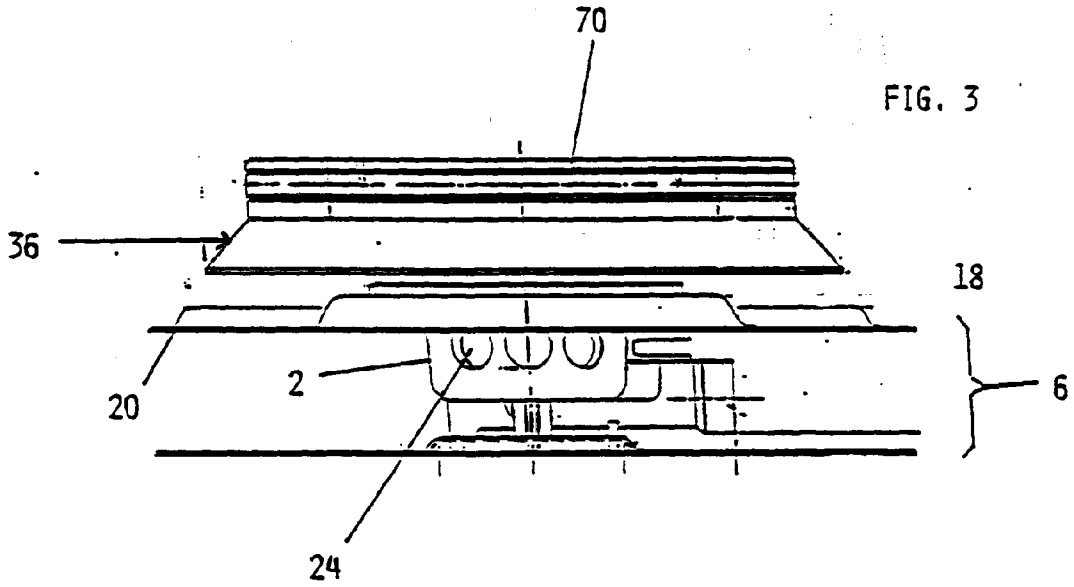


FIG. 3



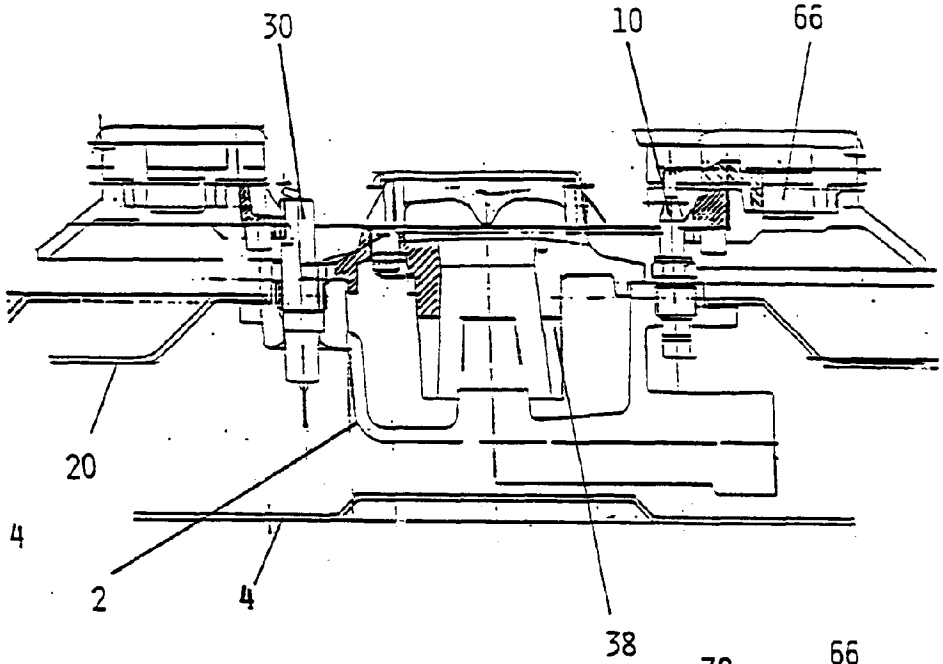


FIG. 4

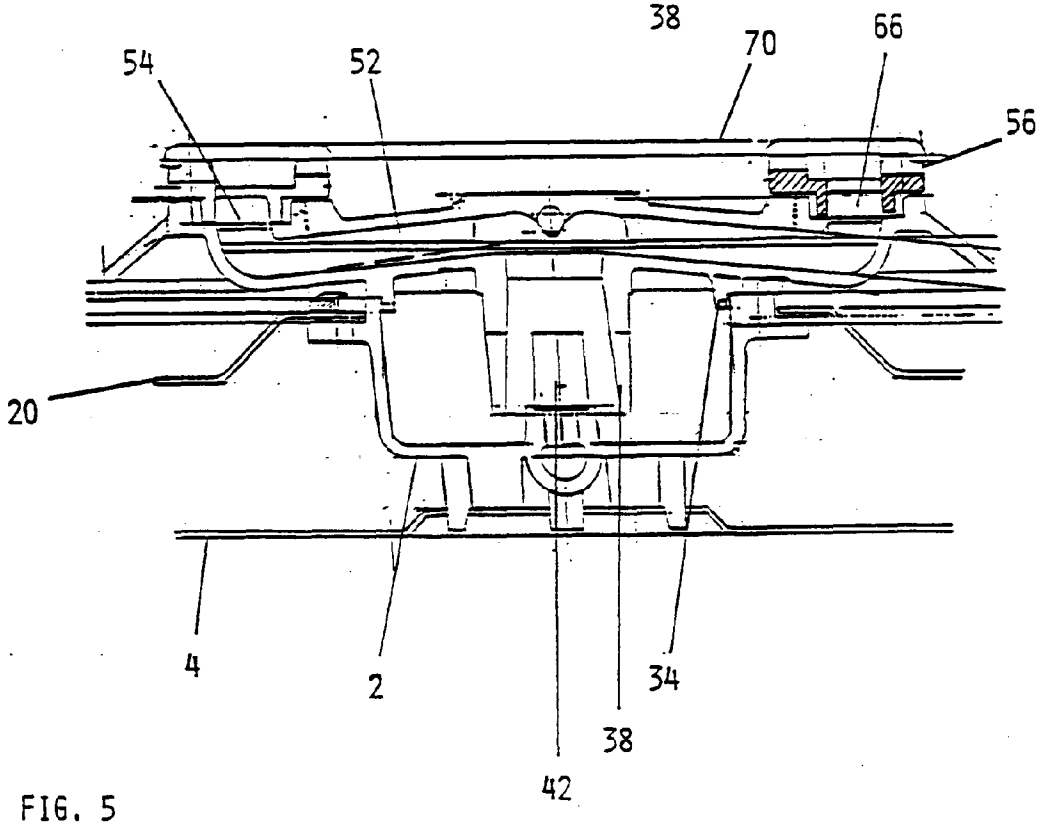


FIG. 5